8 Port Smart Switch CE

Model 232D4SS8

Documentation Number 232D4SS84502

*This product designed and manufactured in Ottawa, Illinois USA
of domestic and imported parts by*

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Chapter 1: HARDWARE

Introduction

The RS-232 Eight Port Smart Switch (232D4SS8) allows one RS-232 host device to connect to eight asynchronous serial devices. Refer to Figure 1. Four RS-232 ports and four RS-232 or RS-485 (two or four wire, send data contol) are standard on the 232D4SS8, depending on the pins you use. Other options and additional RS-422/485 ports are available by contacting B&B technical support. Ports configured as RS-232 support signals TD, RD, RTS, CTS, DTR, and DSR or CD. Refer to Figure 5. Ports configured as RS-422/485 support signals TD and RD only. Refer to Figure 6.

The Master port is DTE or DCE configurable. RS-232 ports "A" through "H" are configured as DTE ports. The 232D4SS8 will switch with baud rates from 300 to 38,400 bps, 7 or 8 data bits, even, odd or no parity, and 1 or 2 stop bits. After the switch is made the 232D4SS8 is transparent to data flow.

There are nine red indicator LED's on the front of the 232D4SS8.   Eight LED's represent ports "A" through "H" and indicate the selected port. The ninth LED is the power on indicator. Nine connectors are located on the back of the 232D4SS8, a DB-25S female Master port connector, and eight DB-25P male connectors for ports "A" through "H". Refer to "Front View" diagram.

Port selection is accomplished by sending a programmable control string to the "Master" port of the Smart Switch. This control string consists of a user-defined character, address character, and port character. When the 232D4SS8 receives the control string the "Master" port will be connected to the designated port. There is no delay through the 232D4SS8 and the data is not buffered. When the 232D4SS8 is set to Smart Switch Mode Port "A" will be selected at power up.

The eight ports on the 232D4SS8 can also be used as a smart switch/port combiner. In addition to using the Master Port for port selection, any of the eight ports can select the Master Port by asserting their CTS line. This function is enabled by setting a switch inside the 232D4SS8.

Specifications

Model: 232D4SS8

Size: 25.65 W x 19.05 D x 8.38 H cm

Power: 12VAC 830mA, 2.5mm power jack

Connectors: Master - DB-25 female (RS-232 or RS-422)

Slave - DB-25 male (RS-232 or RS-422/485)

Switching Baud Rate: From 300 to 38.4 Kbps

Connected Baud Rate: Any baud rate up to 115.2 Kbps

Front View
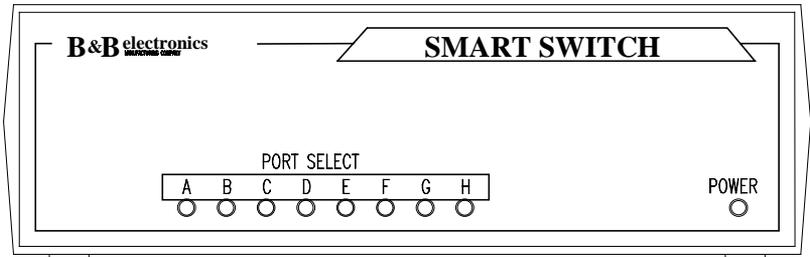
Rear View
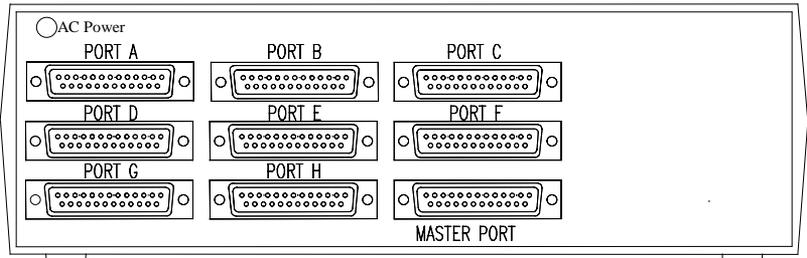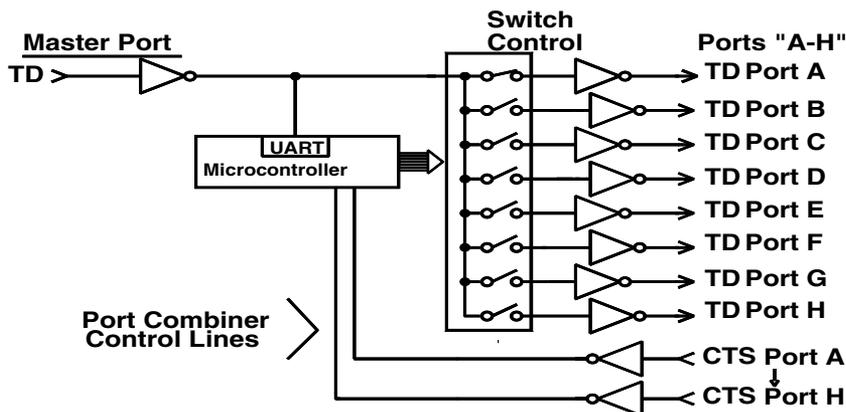
Figure 1. Simplified Functional Diagram

NOTE: This diagram illustrates only the transmit data (TD) signal.

Checklist

The following equipment should be in the shipping carton:

1. Smart Switch

2. Instruction Manual

3. (2) 3 1/2" disks

If any of the items above are damaged or missing contact the shipper immediately.

Serial Data Configuration

In order for the host device, which is connected to the Master Port of the Smart Switch, to select a port, the Smart Switch must be set to match the host's communication format. This is accomplished by setting an eight position DIP switch labeled "SW1" located inside the Smart Switch. Refer to Figure 2. Switch positions 1 through 4 select the baud rate. Switch position 5 selects 7 or 8 data bits. Refer to Table 1. The remaining switch positions will be discussed later. Always power down the Smart Switch before changing switch settings.

Table 1. Communication & Configuration Switch

1	2	3	4	5	6	7	8	Setting
DIP Switch 1								
0	0	0	0	X	X	X	X	300 Baud
1	0	0	0	X	X	X	X	600 Baud
0	1	0	0	X	X	X	X	1200 Baud
1	1	0	0	X	X	X	X	2400 Baud
0	0	1	0	X	X	X	X	4800 Baud
1	0	1	0	X	X	X	X	9600 Baud *
0	1	1	0	X	X	X	X	19.2K Baud
1	1	1	0	X	X	X	X	38.4K Baud
X	X	X	X	0	X	X	X	8 Data Bits *
X	X	X	X	1	X	X	X	7 Data Bits
X	X	X	X	X	0	X	X	Smart Switch Mode *
X	X	X	X	X	1	X	X	Smart Switch and Port Combiner Mode
X	X	X	X	X	X	0	X	3 Char. Command *
X	X	X	X	X	X	1	X	4 Char. Command
X	X	X	X	X	X	X	0	Port Select Test Off *
X	X	X	X	X	X	X	1	Port Select Test On

0 = OFF   1 = ON   X = DON'T CARE
* = FACTORY DEFAULT

Port Configuration

The 232D4SS8 has a Master port and eight selectable ports labeled "A" through "H". Refer to "Rear View". The Master port should be connected to the RS-232 device that will be selecting the ports. Ports "A - H" connect to the RS-232 or RS-422/485 devices that will communicate with the Master port device.

Master Port

The Master port can be configured by the user as a DCE or a DTE port. In order to determine the proper Master port configuration of the 232D4SS8 it is necessary to have a basic understanding of the terms DCE and DTE. RS-232 was designed, using DB-25 connectors, for connecting a DTE (**D**ata **T**erminal **E**quipment) device to a DCE (**D**ata **C**ommunication **E**quipment) device. Each device will have inputs on pins that correspond to outputs on the same pins of the other device. For example, a DTE device transmits data out on pin 2 and a DCE device receives data in on pin 2. IBM PC's are DTE devices, modems are DCE devices. The Master port is shipped configured as a DCE port.

Figure 2. Printed Circuit Board Outline
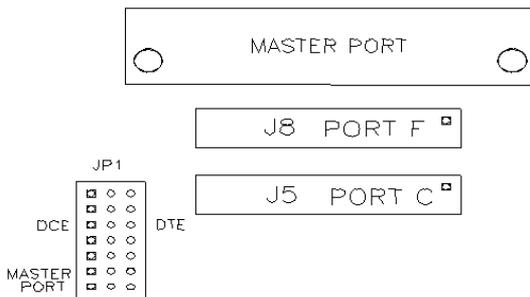
Figure 3. Master Port DCE/DTE Jumpers
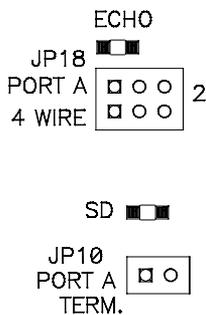
Figure 4. PC Board Options for RS-485

If an IBM PC (DTE device) is connected to the 232D4SS8 Master port, the Master port should be configured as a DCE port. If a modem (DCE device) is connected to the Master port, it should be configured as a DTE port. Refer to cable charts in Appendix B.

The Master port is configured as either a DCE port or a DTE port by moving jumpers JP1: 1 through JP1: 7. JP1 is located inside the Smart Switch. Refer to Figures 2 & 3. To configure the Master port as a DCE port, jumpers JP1: 1 through JP1: 7 must be moved to the DCE position. Refer to Table 2. To configure the Master port as a DTE port, jumpers JP1: 1 through JP1: 7 must be moved to the DTE position. Refer to Table 3.

Table 2. DCE MASTER PORT CHART

Pin #	Signal	Description	Signal Direction of DCE Master Port
2	TD	Transmit Data	Input
3	RD	Receive Data	Output
4	RTS	Request to Send	Input
5	CTS	Clear to Send	Output
6*	DSR	Data Set Ready	Output
7	SG	Signal Ground	<------>
8*	CD	Carrier Detect	Output
20	DTR	Data Term. Ready	Input
14**	TD (B)	Transmit +	Output
15**	TD (A)	Transmit -	Output
16**	RD (B)	Receive +	Input
17**	RD (A)	Receive -	Input

* Pins 6 & 8 are tied together inside the 232D4SS8 and share the same output. Refer to Figure 5.

** RS-422 Master port option.

Important: All jumpers must be in the same position, either DCE or DTE positions. Do not mix positions! Refer to Figure 3 which shows the Master port configured as a DCE port.

CAUTION: Always power down the Smart Switch before removing its cover.

Table 3. DTE MASTER PORT CHART

Pin #	Signal	Description	Signal Direction of DTE Master Port
2	TD	Transmit Data	Output
3	RD	Receive Data	Input
4	RTS	Request to Send	Output
5	CTS	Clear to Send	Input
6*	DSR	Data Set Ready	Input
7	SG	Signal Ground	<------>
8*	CD	Carrier Detect	Input
20	DTR	Data Term. Ready	Output
14**	TD (B)	Transmit +	Output
15**	TD (A)	Transmit -	Output
16**	RD (B)	Receive +	Input
17**	RD (A)	Receive -	Input

* Pins 6 & 8 are tied together inside the 232D4SS8 and share the same input. Refer to Figure 5.

** RS-422 master port option only.

Table 4. DTE PORTS A - H

Pin #	Signal	Description	RS-232 Signal Direction of DTE Ports A through H
2	TD	Transmit Data	Output
3	RD	Receive Data	Input
4	RTS	Request to Send	Output
5	CTS	Clear to Send	Input
6*	DSR	Data Set Ready	Input
7	SG	Signal Ground	<------>
8*	CD	Carrier Detect	Input
20	DTR	Data Term Ready	Output
14**	TD(B)	Transmit (+)	Output
15**	TD(A)	Transmit (-)	Output
16**	RD(B)	Receive (+)	Input
17**	RD(A)	Receive (-)	Input

*Pins 6 & 8 are tied together inside the 232D4SS8 and share the same input. Refer to Figure 5.

** RS-422/485 option if installed.

The 232D4SS8 has eight ports labeled "A - H". Refer to "Rear View". Any of these ports can be manufactured to meet either RS-232 or RS-422/485 electrical characteristics. The 232D4SS8 comes standard with four RS-232 ports and four ports that are RS-232 or RS-485 depending on the pins that you use.

RS-232 Configuration

All eight RS-232 slave ports will be wired as DTE ports. Refer to Table 4 for pin out, signal name, and signal direction information. Also, refer to Figure 5 for a simplified schematic showing the relationship between the Master port and any RS-232 port "A-H". Refer to Appendix B for cable charts.
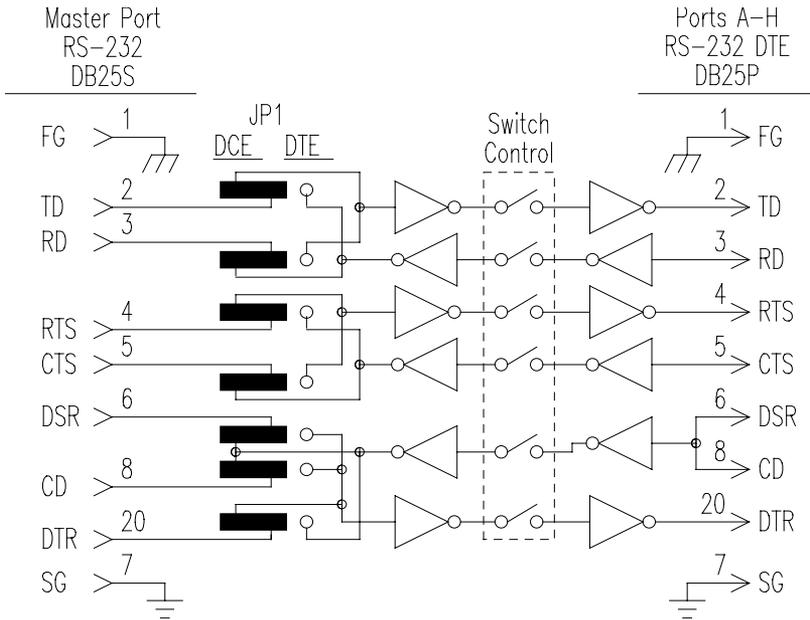
Figure 5. Simplified RS-232 Schematic

RS-422/485 Slave Port Option

The RS-232 transmit and receive data signals on the Master port will be converted to balanced, full-duplex RS-422 or half-duplex RS-485 signals with this option. The 232D4SS8 comes standard with four RS-485 (2 or 4-wire) slave ports. Refer to Appendix B for cable charts.

Table 5. RS-422/485 PORTS A - H

Pin #	Signal	Description	RS-422/485 Signal Direction of Ports A - H
15	TD(A)	Transmit Data (-)	Output
14	TD(B)	Transmit Data (+)	Output
7	SG	Signal Ground	<------>
17	RD(A)	Receive Data (-)	Input
16	RD(B)	Receive Data (+)	Input

Figure 6. Simplified RS-422/485 Schematic
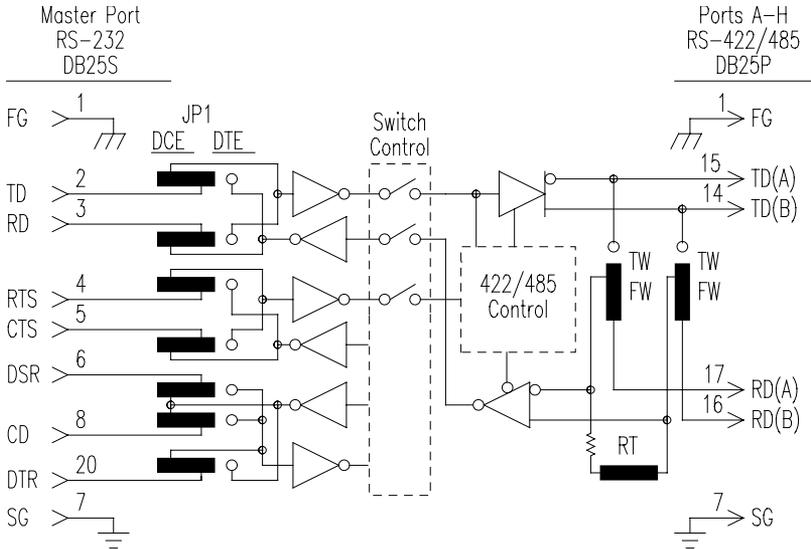
When a port has this option, additional circuitry will be mounted to the main board. The standard 232D4SS8 comes with the RS-485 option on four ports (Port A-D). Use Figure 2 to locate its position. Refer to Table 5 for pin-out, signal name, and signal direction information. Also, refer to Figure 6 for a simplified schematic showing the relationship between the Master port and a port configured with the RS-422/485 option.

NOTE: This option only supports transmit and receive data signals (TD & RD) from the Master port.

RS-422/RS-485 Mode

The model 232D4SS8 comes standard with an automatic send data (SD) control of the RS-485 driver. SD control automatically enables the RS-485 driver by sensing the leading edge of the first character transmitted from the device connected to the Master port. After the last character transmits, the send data timer circuit waits one character time (about 1 millisecond at 9600 baud) before disabling the RS-485 driver.

There are two components located in the port B circuit area on the main printed circuit board, a resistor (R75) and a capacitor (C4), that are part of the send data control circuit. These components are factory selected for 9600 baud, which allows the send data control to operate at 9600 baud or higher. With these two components the RS-485 driver will be disabled approximately 1 millisecond after the last character has been sent. To change to a baud rate lower than 9600 baud, or to configure the send data control to match a specific baud rate, change R75 and C4 to the value specified in Table 6. Use Figure 3 to locate R75 and C4. Note that these timing components are not used when the handshake control method is selected.

Table 6. Component Values For Send Data Timing

Baud Rate	Time (ms)	Resistor Value R75 (ohms)	Capacitor Value C4(microfarads)
300	33.3	330K	.1
600	16.6	160K	.1
1200	8.33	820K	0.01
2400	4.16	430K	0.01
4800	2.08	200K	0.01
9600	1.04	100K	0.01
19200	0.520	56K	0.01
38400	0.260	27K	0.01
56700	0.176	16K	0.01
115200	0.0868	8.2K	0.01

To configure a port for RS-485 two-wire mode, both jumpers must be placed in the two-wire "2" position for the corresponding port Refer to Figure 4 for these jumper locations. The TD (A) and RD (A) lines need to be connected together; also the TD (B) and RD (B) lines need to be connected to each other. Giving you a Data (A) line and a Data (B) line. "A" being "+" and "B" being "-".

Handshake control (RTS) requires that the software use a handshake signal to enable/disable the RS-485 driver. The handshake signal RTS (pin 4) is used when the Master port is configured as a DCE port and CTS (pin 5) is used when the Master port is configured as a DTE port. If the RTS option is needed, contact B&B technical support for details.

Another option available on the 232D4SS8 is the slave ports set up as RS-422 ports. This means that the driver and receiver will be enabled all the time. RS-422 allows point-to-point operation or up to 10 receive only units up to 4000 feet on two pair of lines.

Smart Switch Operation

The 232D4SS8 has two modes in which it can select ports, smart switch, and smart switch/port combiner.

Smart Switch Mode

Position 6 of SW1 must be in the off position to enable this mode. Refer to Figure 2 and Table 1. The Smart Switch is a listen only device. It constantly monitors the serial data received on the Master port for a command control string. A command can switch on or switch off any desired port. The command control string can be configured as a three-character command or a four-character command. In this mode Port "A" will be selected at power up.

Three Character Command String

The first character is user defined by setting SW2, an eight-position DIP switch. SW2 is programmed at the factory to the ASCII character STX (decimal 2). The second character represents the hexadecimal address of the Smart Switch where the desired port is located. The address for the 232D4SS8 is always zero (0). The third character is the ASCII upper case letter that represents the desired port. Letters "A", "B", "C", "D", "E", "F", "G" or "H" (decimal 65, 66, 67, 68, 69, 70, 71, or 72 respectively) are used to select ports on the 232D4SS8.

Example 1: To turn on port E of the 232D4SS8 (address zero) with ASCII STX (2 decimal) character set as the user defined character.

Send to the Master Port: STX 0 E
(2 48 69 decimal)

When you are done with a port you can either select a new one directly or turn off the selected port and then turn on the next one. It is recommended that the selected port be turned off before selecting the next port. For this reason, if port A is currently selected and a command is sent to select port E, the command characters (STX 0 E) will pass through to the port A device and because characters "0" and "E" are printable they may appear on that device.

To turn any selected port off, the first and second character of the command control string must be the user-defined character. The third character must be the ASCII EOT character (decimal 4).

Example 2: To turn off all ports, with ASCII STX (decimal 2) set as the user defined character.

Send to the Master Port: STX STX EOT
(2 2 4 decimal)

It is recommended that the user-defined character be a non-printable character. The turn off command will then consist of three characters that will not show up on the current port device.

If you were writing a program in GWBASIC to select port E of the 232D4SS8 (address zero) you would form a string like this:

SW0E$ = CHR$(2) + "0" + "E"

You could then send SW0E$ to select port E. Similar strings could be used for turning on the other ports. To turn off the ports the string might look like this:

TOFF$ = CHR$(2) + CHR$(2) + CHR$(4)

NOTE: There is no delay through the Smart Switch and the data is not buffered.

Four Character Command String

The four-character command adds additional security to port selection. The only difference between the four-character command and the three-character command is the addition of the ASCII ESCape character in front of the three-character command.

The first character is the ASCII ESC character (decimal 27). The second character is user-defined character. The third character is the desired port address (0). The fourth character is the ASCII upper case letter of the desired port. Refer to the "Three Character Command String" section for more information regarding the last three characters.

Example 1: To turn on port E of the 232D4SS8 (address zero) with ASCII STX set as the user defined character.

Send to Master port: ESC STX 0 E

(27 2 48 69 decimal)

The turn off string also adds the ASCII ESC character to the front of the three-character turn off string.

The first character is the ASCII ESC character. The second and third character of the command control string is the user-defined character. The fourth character is the ASCII EOT character (decimal 4).

Example 2: To turn off all ports and the user defined character is ASCII STX (decimal 2).

Send to Master Port: ESC STX STX EOT

(27 2 2 4 decimal)

It is recommended that the user-defined character be a non-printable character. The turn off command will then consist of four characters that will not show up on the current port device.

If you were writing a program in GWBASIC to select port E of the 232D4SS8 (address zero) you would form a string like this:

SW0E$ = CHR$(27) + CHR$(2) + "0" + "E"

You could then send SW0E$ to select port E. Similar strings could be used for turning on the other ports. To turn off the ports the string might look like this:

TOFF$ = CHR$(27) + CHR$(2) + CHR$(2) + CHR$(4)

NOTE: There is no delay through the Smart Switch and the data is not buffered.

Programming the User Defined Character

The user-defined character comes programmed as the ASCII STX character (decimal 2). You can change this to any 8-bit character you wish by reprogramming DIP switch 2 (SW2). SW2 is located on the printed circuit board inside the 232D4SS8. Refer to Figure 2. SW2 is an eight-position switch with each position equal to a certain weight. Refer to Table 4. It is recommended that a non-printable character be defined.

Table 4. SW2 Weight Chart

DIP Switch 2	Weight
1	1
2	2
3	4
4	8
5	16
6	32
7	64
8	128

For example, if you wish to use the ASCII NAK character as the user defined character, which has a decimal value of 21, you would turn on switches 1, 3, and 5 (1 + 4 + 16 = 21). Caution should be used when selecting the user defined character, so that by itself, or with the ESC character in front of it (4-character command), or with the character following it, it is not a valid command to any of the devices connected to the ports. For instance, on some printers ESC @ is the reset command. If you tried to use the @ symbol (decimal 64) for the user defined character you could reset your printer every time the command control string is sent. Note also, that if your communication configuration is set for 7 data bits you cannot use the eighth position of SW2. For a list of the ASCII character codes and their decimal values refer to Appendix A.

Smart Switch/Port Combiner Mode

This mode allows the CTS lines of ports A - H of the 232D4SS8 to select the Master port. It also allows selection from the Master port via the command control string described in the Smart Switch Mode section. Position 6 of DIP switch 1 (SW1) must be in the ON position to enable this mode. Refer to Figure 2. When all ports are off and the CTS line (pin 5) goes high on any of the eight ports, a connection is established from that port to the Master port. This works on a first-come-first-serve basis and only for RS-232 configured ports. At power up in this mode there is no port selected.

For example, if port A of the 232D4SS8 wanted to established a connection to the Master port, port A would raise its CTS line (pin 5) high. The 232D4SS8 would recognize this as a prompt for connection to the Master port. The connection would be dropped as

soon as the CTS line on port A was lowered. At that time any of the other RS-232 ports on the 232D4SS8 can raise their CTS line to establish connection. If port A is connected to the Master port and any of the other RS-232 ports on the 232D4SS8 raises their CTS line, the data sent to the 232D4SS8 from those ports would be lost. The 232D4SS8 does not have buffering.

Note that when a port is selected via the Master port, the CTS lines will be ignored until the Smart Switch receives the turn off command from the Master port. When a CTS line selects the Master port, all commands will be ignored until CTS goes low.

A typical application would be to tie CTS & RTS together on the Master port. So when CTS on a port is raised, RTS on that port also goes high establishing a connection for your hardware. Note that RTS will be low until connection to the Master port has been completed. The other ports will be held off because TD, RTS, and DTR will be low. After CTS goes low, the 232D4SS8 will scan the CTS lines starting with the next port. When there are no ports selected Port A will have first priority, port B second and so on.

Binary File Transfer

A simple method of using the Smart Switch to transfer binary files without the concern of it accidentally disconnecting, is to set the file transfer at a baud rate different from the baud rate of the Smart Switch. When transferring files at a different baud rate, the Smart Switch will stay connected from the last command control string.

Port Select Test

The 232D4SS8 has a built-in port select test. Placing DIP switch 1 (SW1) position 8 in the on position and powering up the 232D4SS8 starts this test. Refer to Figure 2. It will test the port selection, and address circuits for all eight ports.   When the test is started each port will be individually turned on for one second, starting with port A on the 232D4SS8 and ending with port H for a total test time of eight seconds. Once the last port has been turned off the test will start over and continue looping until SW1 position 8 is placed in the off position, at which time the Smart Switch will begin normal operation. This test is can be used to verify address settings of the port expander modules.

Chapter 2: SOFTWARE

232D4SS8 Users

Any references to the 232XSS in this section are also intended for the 232D4SS8 Smart Switch.

Introduction

The 232D4SS8 is shipped with 2 disks containing a Windows software program that will test the operation of the Smart Switch. When installed the program will allow the Smart Switch to select all available ports.

- The Expandable Smart Switch Selector program (232XS) for Windows 95/98/2000 and NT with service pack 3 can be used for troubleshooting or in multitasking environments to select slave ports. There will be a Visual Basic example file that can be accessed by selection Start/Program Files/B&B Electronics/232XSS/XSS-EX. This file will give examples on opening, selection and sending data out a port. The 232XS program requires 2M of memory.

Windows Selector Program Installation/Instructions

Method One

- Place the "Windows" disk #1 in drive A. (These instructions use drive A as default for the floppy drive. Replace A with your drive letter if necessary.)

- Select Settings from the Start Button and click on Control Panel.

- In the Control Panel Window, double click on the Add/Remove Programs.

- Click on the "Install" button.

- Follow the instructions of the setup program.

Method Two

- Place the "Windows" disk #1 in drive A. (The instruction use drive A as default for the floppy drive. Replace A with your drive letter if necessary)

- Select Programs from the Start Button and click on Windows Explorer. Click on the drive containing the SS Setup Disk.

- Double click on the file "Setup.exe".

- Follow the instructions of the setup program.

Smart Switch Setup

To open the program select the Start button then Programs. Under B&B Electronics select the 232XSS and 232XS5 program. The Smart Switch program will prompt the user to select the Module that is in use the first time that the software is run. After the proper Module (232XSS or 232XS5) (232D4SS8 models use 232XSS) is selected then a window specific to that Module will appear and the user may personalize communication parameters as per their specific needs. Com port, Baud Rate, and Data Bits (Character Mode, and User Defined Character may also be set for 232XSS and 232XS5 Modules. The Switch address is 0 for the main device.

Should the user desire to change the Module choice to another, select model in the Settings menu. Then select one of the two support Module types (232XSS or 232XS5). After changing the module number the user will see the window for the selected Smart Switch.

Default Values

When you start Smart Switch software, the default values will be used. The default values are:

Description	Default Value
Port Address	COM 2
Baud Rate	9600
Data Bits	8 Data Bits
Character Mode	3

Selecting Ports

To change the com port the user need only go to the Settings Menu and select the Com Port tab. Then select the com port to which the device is attached. The Smart Switch program supports com ports 1 through 6.

Uninstalling Windows Smart Switch Selector Program

- Go to "Control Panel" and click on "Add/Remove Programs"

- Click on "Smart Switch" and the click "Remove"

- Windows will then "Automatically" remove the program from your system

APPENDIX A: ASCII Character Codes

DECIMAL to HEX to ASCII CONVERSION TABLE														
DEC	HEX	ASCII	KEY	DEC	HEX	ASCII	DEC	HEX	ASCII	DEC	HEX	ASCII
0	0	NUL	ctrl @	32	20	SP	64	40	@	96	60	`
1	1	SOH	ctrl A	33	21	!	65	41	A	97	61	a
2	2	STX	ctrl B	34	22	"	66	42	B	98	62	b
3	3	ETX	ctrl C	35	23	#	67	43	C	99	63	c
4	4	EOT	ctrl D	36	24	$	68	44	D	100	64	d
5	5	ENQ	ctrl E	37	25	%	69	45	E	101	65	e
6	6	ACK	ctrl F	38	26	&	70	46	F	102	66	f
7	7	BEL	ctrl G	39	27	'	71	47	G	103	67	g
8	8	BS	ctrl H	40	28	(	72	48	H	104	68	h
9	9	HT	ctrl I	41	29	)	73	49	I	105	69	i
10	A	LF	ctrl J	42	2A	*	74	4A	J	106	6A	j
11	B	VT	ctrl K	43	2B	+	75	4B	K	107	6B	k
12	C	FF	ctrl L	44	2C	,	76	4C	L	108	6C	l
13	D	CR	ctrl M	45	2D	-	77	4D	M	109	6D	m
14	E	SO	ctrl N	46	2E	.	78	4E	N	110	6E	n
15	F	SI	ctrl O	47	2F	/	79	4F	O	111	6F	o
16	10	DLE	ctrl P	48	30	0	80	50	P	112	70	p
17	11	DC1	ctrl Q	49	31	1	81	51	Q	113	71	q
18	12	DC2	ctrl R	50	32	2	82	52	R	114	72	r
19	13	DC3	ctrl S	51	33	3	83	53	S	115	73	s
20	14	DC4	ctrl T	52	34	4	84	54	T	116	74	t
21	15	NAK	ctrl U	53	35	5	85	55	U	117	75	u
22	16	SYN	ctrl V	54	36	6	86	56	V	118	76	v
23	17	ETB	ctrl W	55	37	7	87	57	W	119	77	w
24	18	CAN	ctrl X	56	38	8	88	58	X	120	78	x
25	19	EM	ctrl Y	57	39	9	89	59	Y	121	79	y
26	1A	SUB	ctrl Z	58	3A	:	90	5A	Z	122	7A	z
27	1B	ESC	ctrl [	59	3B	;	91	5B	[	123	7B	{
28	1C	FS	ctrl \	60	3C	<	92	5C	\	124	7C	l
29	1D	GS	ctrl]	61	3D	=	93	5D	]	125	7D	}
30	1E	RS	ctrl ^	62	3E	>	94	5E	^	126	7E	~
31	1F	US	ctrl _	63	3F	?	95	5F	_	127	7F	DEL

APPENDIX B: Cable Charts

These charts indicate some common cable wiring based on the DCE/DTE configuration of the Master Port. Refer to the Port Configuration section of this manual for information on Master Port configurations.

Chart 1. IBM PC DB25 Connector to Master Port

Master port configured as a DCE port.

IBM PC Serial Port DB25 Connector	Signal Direction	232D4SS8 Master Port (DCE) DB25 Connector
2	----------->	2
3	<-----------	3
4	----------->	4
5	<-----------	5
6	<-----------	6*
7	<--------->	7
8	<-----------	8*
20	----------->	20

* Pins 6 & 8 are tied together inside the 232D4SS8 and share the same output.

Chart 2. IBM PC DB9 Connector to Master Port

Master port configured as a DCE port.

IBM PC Serial Port DB9 Connector	Signal Direction	232D4SS8 Master Port (DCE) DB25 Connector
1	<-----------	8*
2	<-----------	3
3	----------->	2
4	----------->	20
5	<--------->	7
6	<-----------	6*
7	----------->	4
8	<-----------	5

* Pins 6 & 8 are tied together inside the 232D4SS8 and share the same output.

Chart 3. Modem DB25 Connector to Master Port

Master port configured as a DTE port.

Async Modem Serial Port DB25 Connector	Signal Direction	232D4SS8 Master Port (DTE) DB25 Connector
2	<-----------	2
3	----------->	3
4	<-----------	4
5	----------->	5
7	<--------->	7
8	----------->	8*
20	<-----------	20

* Pins 6 & 8 are tied together inside the 232D4SS8 and share the same input.

NOTE: When using chart 3 above and connecting a DTE device to ports A - H of the smart switch, refer to Charts 7 and 8.

Chart 4. DCE Device w/DB25 Connector to Ports A - H (DTE)

Master port configured as a DCE port.

DCE Device Serial Port DB25 Connector	Signal Direction	232D4SS8 Ports A - H (DTE) DB25 Connector
2	<-----------	2
3	----------->	3
4	<-----------	4
5	---------->	5
6	---------->	6*
7	<--------->	7
8	----------->	8*
20	<-----------	20

* Pins 6 & 8 are tied together inside the 232D4SS8 and share the same input.

Chart 5. IBM PC DB25 Connector to Ports A - H (DTE)

Master port configured as a DCE port.

IBM PC Serial Port DB25 Connector	Signal Direction	232D4SS8 Ports A - H (DTE) DB25 Connector
2	----------->	3
3	<-----------	2
4	----------->	5
5	<----------	4
6	<----------	6*
7	<--------->	7
8	<-----------	8*
20	----------->	20

* Pins are tied together inside the 232D4SS8 and share the same input.

Chart 6. IBM PC DB9 Connector to Ports A - H (DTE)

Master port configured as a DCE port.

IBM PC Serial Port DB9 Connector	Signal Direction	232D4SS8 Ports A - H (DTE) DB25 Connector
2	<-----------	2
3	----------->	3
4	----------->	6*
5	<--------->	7
6	<-----------	20
7	----------->	5
8	<-----------	4

* Pins 6 & 8 are tied together inside the 232D4SS8 and share the same input.

Chart 7. IBM PC DB25 Connector to Ports A - H (DTE)

Master port configured as a DTE port with a modem
connected (see Chart 3).

IBM PC Serial Port DB25 Connector	Signal Direction	232D4SS8 Ports A - H (DTE) DB25 Connector
2	----------->	3
3	<-----------	2
4	----------->	5
5	<-----------	4
6	<---- ---->	6*
7	<--------->	7
8	<-----------	20
20	----------->	6*

* Pins 6 & 8 are tied together inside the 232D4SS8 and share the
same input.

Chart 8. IBM PC DB9 Connector to Ports A - H (DTE)

Master port configured as a DTE port
with a modem connected (see Chart 3).

IBM PC Serial Port DB9 Connector	Signal Direction	232D4SS8 Ports A - H (DTE) DB25 Connector
3	----------->	3
2	<-----------	2
7	----------->	5
8	<-----------	4
6	<---- ---->	6*
5	<--------->	7
1	<-----------	20
4	----------->	6*

* Pins 6 & 8 are tied together inside the 232D4SS8 and share
the same input.

Chart 9. RS-422/485 4-Wire Device to Port (A - H) Configured as an RS-422 /485 Port.

RS-422/485 4-Wire Device	Signal Direction	232D4SS8 Ports A - H DB25 Connector
TD (A)*	------------>	17 - RD (A)
TD (B)*	------------>	16 - RD (B)
Signal Ground	<---------->	7 - SG
RD (A)*	<-----------	15 - TD (A)
RD (B)*	<-----------	14 - TD (B)

* If the device being connected uses "+" and "-" in place of "B" and "A", the "+" replaces the "B" and the "-" replaces the "A".

NOTE: Make sure the port's set-up jumpers are in the proper position for four-wire communications.

Chart 10. RS-485 2-Wire Device to Port (A - H) Configured as an RS-485 Port.

RS-485 2-Wire Device	Signal Direction	232D4SS8 Ports A - H DB25 Connector
Data (A)*	<---------->	15 - TD (A)
Data (B)*	<---------->	14 -TD (B)
Signal Ground	<---------->	7 - SG

- If the device being connected uses "+" and "-" in place of "B" and "A", the "+" replaces the "B" and the "-" replaces the "A".
- Place a jumper between the TD (A) and the RD (A) to make the Data (A) line. Also place a jumper between TD (B) and RD (B) to make the Data (B) line.

NOTE: Make sure the port's set-up jumpers are in the proper position for two-wire communications.

APPENDIX C: Declaration of Conformity

DECLARATION OF CONFORMITY

Manufacturer's Name:	B&B Electronics Manufacturing Company
Manufacturer's Address:	P.O. Box 1040
	707 Dayton Road
	Ottawa, IL 61350 USA
Model Number:	232D4SS8
Description:	Eight-port Smart Switch
Type:	Light industrial ITE equipment
Application of Council Directive:	89/336/EEC
Standards:	EN 50082-1
	EN 61000 (-4-2, -4-3, -4-4, -4-6)

CE

William H. Franklin III, Director of Engineering